A unified account of the behaviour of high vowels in Bothoa Breton

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Skol-veur Roazhon

Caveat emptor

- There are no spectacularly interesting data in this talk
- And the data are second-hand
- I want to show that close analysis of rather minute details of alternations is potentially interesting
- So bear with me

Roadmap

- Bothoa Breton glides and high vowels: a relatively boring story
- Tools deployed
  - Substance-free phonology, language-specific phonological representation
  - Stratal OT derivation
- Making sense of the pattern...
- ...and of the exceptions
- Support for the stratal model

Gliding of high vowels

- It is well-known in phonological theory (e. g. Levi 2011) that high vowels [i u] and glides [w j] (also [y] and [ɥ] etc.) can stand in (almost) complementary distribution
- Normally optimization is for syllable structure

(1) Latin: avoid complex onsets, then avoid hiatus

a. Glides: #_V, V_V

(i)	/iekur/	[.je.kur.]	‘liver’
(ii)	/ouis/	[.o.wis.]	‘sheep’

b. Vowels: C_

(i)	/mulier/	[.mu.li.er.]	‘woman’
(ii)	/mutuus/	[.mu.tu.us.]	‘mutual’

Analysis and exceptions

- Simplest analysis: there is no phonological (“phonemic”) distinction between /u/ and /w/, /i/ and /j/
- Not in featural structure anyway
- Distinction can be in prosodic structure (e. g. moraic vs. nonmoraic), interpreted phonetically as a vowel vs. glide distinction
- Levi (2004, 2011) and others: in some languages, there must be an underlying distinction

(2) Italian (Krämer 2009)

a.	(i)	['pjaːno]	*piano*	‘flat’
	(ii)	['pawza]	*pausa*	‘break’
	(iii)	['kwi]	*qui*	‘here’
b.	(i)	[piˈaːno]	*piano*	‘of Pius’
	(ii)	[baˈuːle]	*baule*	‘trunk’
	(iii)	['kuːi]	*cui*	‘of which’

Bothoa Breton

- Source: Humphreys (1995) (also Humphreys’ 1985 UBO dissertation for the glossary)
- Eastern Cornouaille dialect, with a noticeable Vannetais slant
- Segmental phonology is fairly unremarkable for Breton
- Caveat: the segments [ʧ ʤ] are clearly phonemic

(3)

a.	(i)	['stʃøːl]	*skeul*	ladder
	(ii)	['køwəd̥]	*kavout*	find
b.	(i)	['ʧɛvələ̊g̊]	*kefeleg*	woodcock
	(ii)	[kazəˈkɛnəg̊]	*kazekenneg*	mares
c.	(i)	['ʧahəd̥]	*kerzhet*	to walk
	(ii)	['kaləd̥]	*kalet*	hard

Bothoa Breton

- The prosodic system is quite different
  - Unpredictable distribution of vowel length
  - Stress system: weight-to-stress, default-to-opposite, numerous cyclic effects
  - Quantity system lost: ['V:T] and ['V̆D] are OK
- Context for all this: a holistic approach to the system, full-language analysis (for reasons I will return to below)
- Coming soon to a repository near you...

Gliding in Bothoa Breton

- So what about gliding?
- It’s almost well-behaved
- Phonemic opposition is difficult to show
  - No minimal pairs for [u] ∼ [w] and [y] ∼ [ɥ]
  - One pair for [i] ∼ [j]

(4)

a.	['ʧɛːriəw]	*kevrioù*	‘strings’
b.	['ʧɛːrjəw]	*kêrioù*	‘villages’

- Humphreys (1995, p. 166): « [L]a paire unique ... est loin de constituer une preuve d’opposition, car les deux mots n’ont pas le même nombre de syllabes »
- Although syllabification should be predictable, so it’s not a real solution

More problems

- It would appear there is generally gliding to avoid hiatus, even at the expense of complex onsets

(5)

a.	['bjan]	*bihan*	'small'
b.	['pjɒh]	*peoc'h*	'peace'
c.	['lwarn]	*louarn*	'fox'

- Although sometimes it fails

(6)

a.	[pasi'ãnto]		'wait'
b.	['bɒrdiəw]	*bordioù*	'tables'
c.	['biːniə̯d]	*benniget*	'blessed'
d.	['kãːniam]	*kaniamp*	'we will sing'

The proposal

- So, is Bothoa Breton one of those languages with underlying glides?
- I will argue the answer is no
- The difference between [i u] and [j w] is prosodic affiliation
- ☞ This is not so for [y] vs. [ɥ], but no time for that today
- The surface exceptions are all explainable via stratal computation
- Most of the exceptionality is principled, with a very few cases of lexically determined eccentricities in computation
- Now fasten your seat belts, ladies and gentlemen

Substance-free phonology

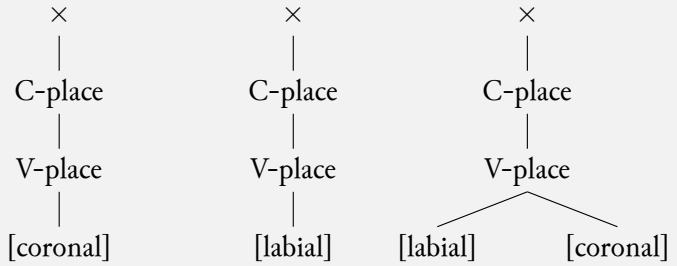
- Morén (2006, 2007); Blaho (2008); Youssef (2010); Iosad (2012, forthcoming)
- Phonology is an autonomous module of grammar
- No universal phonology-phonetics mapping
- No universal feature set (a bit like Mielke 2007)
- No functional considerations in computation
- ☞ Phonological representations are determined based on the patterns in each language at hand

Stratal OT

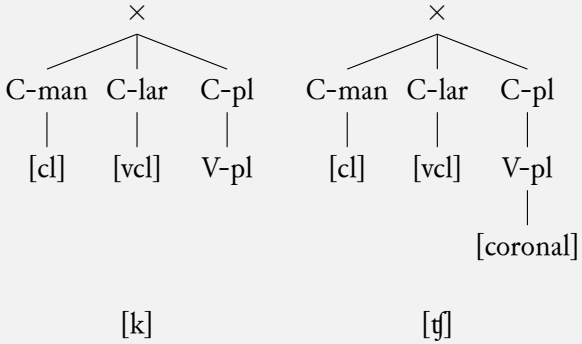
- Kiparsky (2000, 2008); Bermúdez-Otero (2007, 2011, forthcoming)
- Computation proceeds in three steps
  - Stem-level (at least root-to-stem, stem-to-stem derivation)
  - Word-level (stem-to-word)
  - Postlexical (word concatenation)
- Potential reranking across the strata
- "Bracket erasure": only the output of the previous stratum is visible to each computation

High vowels

- See the extra sheet for the full representational system in consonants

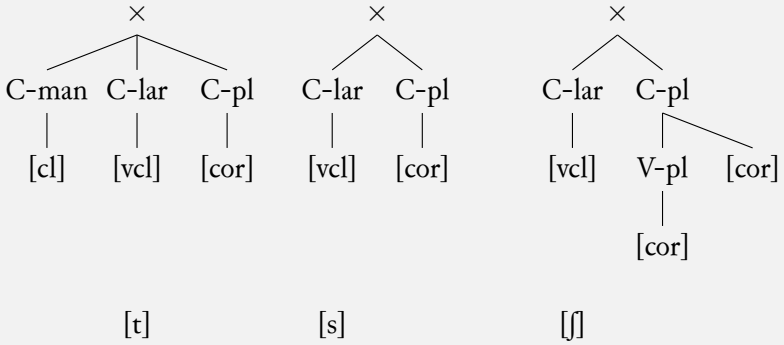


Dorsals and postalveolars



- Note that [ʧ] is, structurally, the union of [k] and [i]

Some important coronals



- Note that [s] ∪ [i] is [ʃ]
- Note also that [t] ∪ [i] \ C-manner[closed] = [ʃ]

No hiatus, complex onsets allowed

- At the stem level, hiatus is avoided, but complex onsets are allowed
- High vowels before other vowels are parsed into onsets: gliding

(7)	a.	(i)	['bwiḍ]	*boued*	'food'
		(ii)	['dwaːr]	*douar*	'land'
	b.	(i)	['bjɒh]	*buoc'h*	'cow'
		(ii)	['hjɒːl]	*heol*	'sun'

- But that's not the whole story

(8)	a.	[komprə'nasion]	'understanding'
	b.	[pasi'ãnto]	'wait'

Where have all the coronals gone?

- Actually, if you discount the above examples (and a few other ones, all French borrowings), there are no tautomorphemic sequences of coronals plus [j]
- What happened?
- I suggest that for the most part they undergo coalescence, e. g. /sj/ ⇒ [ʃ]
- As we shall see at the word level
- But why do we have the French borrowings then?
- We are at the stem level, where we are allowed to have lexically exceptional prosody ("nonanalytic listing"): see Bermúdez-Otero (forthcoming) for a detailed account

The word level: coalescence I

☞ I will stop talking about [w] now, because there is nothing interesting to say

- At the word level, we get coalescence of coronals with a following [j]

(9) [d] → [ʒ]

a.	['pra:d̥]	*prad*	'prayer'
b.	['pra:ʒəw]	*pradoù*	'prayers'

(10) [t] → ʃ

a.	['pond̥]	*pont*	'bridge'
b.	['põ:ʃəw]	*pontioù*	'bridges'

The word level: coalescence II

(11) /z/ → [ʒ]

a.	['mi:z̥]	*miz*	'month'
b.	['mi:ʒəw]	*mizioù*	'months'

(12) [s] → [ʃ]

a.	['plaz̥]	*plas*	'place'
b.	['plaʃəw]	*plasoù*	'places'

(13) [st] → [sʧ]

a.	['lɔst]	*lost*	tail
b.	['lɔsʧəw]	*lostioù*	'tails'

(14) [n] → /ɲ/

a.	['ʧærn]	*korn*	'horn'
b.	['ʧærɲəw]	*kornioù*	'horns'

(15) [l] → [j]

The word level: coalescence III

a.	['pa:l]	*pal*	'shovel'
b.	['pa:jəw]	*palioù*	'shovels'

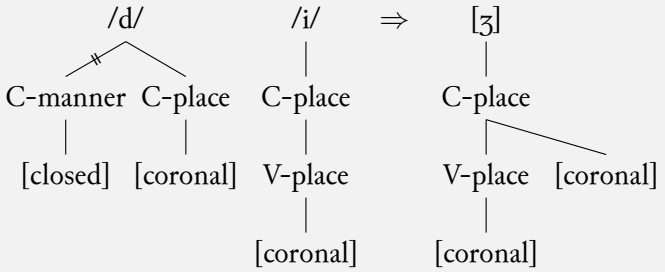
Analysis of coalescence

- This is sometimes treated as a morphologized alternation
- But when the segment is not a coronal (or dorsal), we get a [j]

(16)	a.	(i)	[ˈbroː]	*bro*	‘country’
		(ii)	[ˈbrojəw]	*broioù*	‘countries’
	b.	(i)	[ˈlɛvər]	*levr*	‘book’
		(ii)	[ˈlɛvərjəw]	*levrioù*	‘books’
	c.	(i)	[ˈɛskɔb̥]	*eskob*	‘bishop’
		(ii)	[ɛsˈkɔbjən]	*eskibien*	‘bishops’

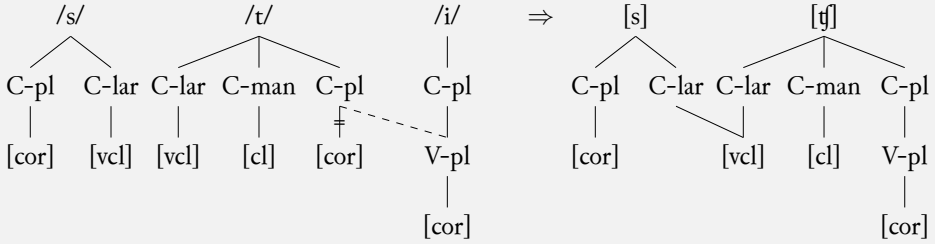
Autosegmental analysis

- Coalescence allows us to avoid *both* hiatus and complex onsets
- When coalescence is disallowed, we can live with a complex onset
- Under our representational assumptions, coalescence is easy to achieve
- Stops: merge all the features, lose C-man[cl] because of feature co-occurrence



Autosegmental analysis cont’d

- Exception: /st/ ⇒ [stʃ]: here, the predicted outcome *[sʃ] is independently blocked by the phonotactics, so we lose C-pl[cor] instead



Autosegmental analysis cont’d

- Fricatives: [s] ⇒ [ʃ]. Coalescence gives the right result without further stipulation.
- Sonorants: [lj] ⇒ [j], [nj] ⇒ [ɲ], [rj] ⇒ [rj]
  - Feature co-occurrence (specifically *{C-man[op], V-pl[cor]}) blocks non-destructive coalescence, with different outcomes (ask me)
- Labials: co-occurrence blocks coalescence, faithfulness blocks deletion of C-pl[lab], so we have to live with a complex onset
- What about dorsals?

Dorsals at the word level I

- In general, **gj* sequences give *j* or *ʒ* or remain (Jackson 1967; Schrijver 2011)
  - Middle Breton *b(a)elec* 'priest', plural *baeleyen*, *beleien* or *beleguyen*; *marchec* 'horse rider', plural *mareien*; *benhuec* 'tool', plural *binhuyou*
  - Modern Breton examples from Favereau (2001): *krog* 'fang', plural *kregier* or *krejer*; *stag* 'string', plural *stegier*, *steier*, *stejer*
- Of course **kj* is very rare

Dorsals at the word level II

- Bothoa does have ['bɛːləǧ] 'priest', pl. ['bɛːliən]
- This is a problem because under the representational assumptions here and the ranking needed to derive the previous facts, we predict coalescence, i. e. [kj gj] ⇒ [ʧ ʤ]
- Coalescence is also found!

(17)

a.	[ˌlasˈtikən]	'rubber band'
b.	['lastiʧəw]	'rubber bands'

- Since it's obviously a recent loan, coalescence is productive (or at least was productive much later than the *beleien* pattern)
- More evidence to be discussed below

Exceptions to hiatus avoidance I

- There are several types of exceptions to hiatus avoidance, and almost all of them can be described in stratal terms
- Faithfulness

(18)

a.	(i)	['baːdi-o]	*badeziñ*	'baptize'
	(ii)	*['baːʒo]		
b.	(i)	['biːni-əd̥]	*benniget*	'blessed'
	(ii)	*['biːɲəd̥]		

Exceptions to hiatus avoidance II

- In exceptions of this type, there is always a morpheme boundary between the vowels
- The [i] receives a mora at the stem level, and the word level cannot remove that

$$\sqrt{\text{baːdi}}$$
$$\Downarrow$$
$$[\text{baːdi}_{\mu}]_{\text{V}}$$
$$\Downarrow$$
$$[[\text{baːdi}_{\mu}]_{\text{V}}\text{o}]_{\text{Wd}}$$

Exceptions to hiatus avoidance III

- A related case: [e] in hiatus raises to [i], no coalescence because of mora preservation

(19)

a.	['klɒːge]	*kloge*	'ladle'
b.	['klɒːgiad̥]	*klogead*	'ladleful'
c.	*['klɒːdʒad̥]		

- This is precisely the difference between [ʧɛːrjəw] 'villages' from [ʧɛːr] and ['ʧɛːriəw] 'strings' from ['ʧɛːri]

An aside: against OO-correspondence

- There is an important advantage to the stratal account in the case of verbal forms such as ['biːnio] and ['baːdio]
- The lack of coalescence here is a clear case of opacity
- OO-correspondence (Benua 1997) and paradigm uniformity (McCarthy 2004) have been proposed for this type of opacity: coalescence underapplies because it must preserve the moraic status of the [i] which is found in related forms
- This does not work in Bothoa Breton, because no verbal form is a bare stem: *['biːni]

☞ In some dialects 2sg imperatives are bare stems, but in Bothoa the 2sg present is used as an imperative form

- In a stratal theory, the existence of the stem-level cycle is a consequence of first principles
- For similar arguments, see Bailyn & Nevins (2008); Bermúdez-Otero (forthcoming)

Further exceptions to gliding

- Coalescence of [əliV] and [ɛliV] gives [iV]

(20)

a.	(i)	['mɒrzəl]	*morzhol*	'hammer'
	(ii)	['mɒrziəw]	*morzholioù*	'hammers'
b.	(i)	['r̥asˌtɛl]	*rastell*	'rake'
	(ii)	['r̥astiəw]	*rastelloù*	'rakes'

- The future suffixes *–iamp* and *–iant*

(21)

a.	['lɛniam]	*leniamp*	'we will read'
b.	[ˌlɛ'niːam]		
c.	*['lɛŋam]		

- Wait until the postlexical level

A final set of exceptions

(With thanks to Ricardo Bermúdez-Otero p. c.)

- There is a very small residue that has no good explanation so far

(22)

a.	['bɒrdiəw]	*bordioù*	'tables'
b.	[avɔ'kadiən]	*avokadien*	'lawyers'

- Not phonotactics: *['bɒrʒəw], *[avɔ'kaʒən] are perfectly fine
- Not faithfulness: this is the word level, where nonanalytic listing is unavailable — no exceptional storage of prosodic structure (Bermúdez-Otero forthcoming)
- Solution: these constructs are exceptional in that the plural is built in the stem-level cycle, giving access to stored prosodic structure
- See Bermúdez-Otero (forthcoming) for details: English exceptional *you*[ŋg]*est*, *lo*[ŋg]*est* against regular *du*[m]*est*, *nu*[m]*est*, *winni*[ŋ]*est*

Mopping up

- Cases such as [ˈmɒrziəw]: we would expect [ˈmɒrzəjəw] as the outcome of the word level
- Postlexical rule [əi] ⇒ [i]
- Needed anyway because of phonotactics (*[əi] not a possible sequence)
- Cases such as [ˈlɛniam] coexist with [ˌlɛˈniːam]
- Long vowel is bimoraic by definition, output by the word level
- Optional postlexical shortening cannot completely remove the mora

Prosodic evidence for strata

- The argument for strata would be less circular if we had more evidence than the gliding
- There is some!
- Prosodic system: only the stem level allows stress on subminimal feet
- If a monosyllabic affix is lexically stressed, it can surface with stress:
  - On the stem level: [ˈdɒrn] ‘hand’, [ˈdɒrˌnaḍ] ‘handful’
  - On the word level — only if there is enough material for a bimoraic foot: [ˈdesko] ‘learn’, [ˌdesˈkadəræẓ] ‘teaching’; [ˈbɒḍ] ‘shoe’, [ˈbɒtəw] ‘pair of shoes’ (*[ˌbɒˈtəw]) but [ˌbɒˈtəwjər] ‘pairs of shoes’

Mutation evidence for strata

- The spirantization mutation turns [k] and [ʧ] into [h]

(23)	a.	(i)	[ˈkaːẓ]	*kazh*	‘cat’
		(ii)	[mə ˈhaːẓ]	*va c’hazh*	‘my cat’
	b.	(i)	[ˈʧiː]	*ki*	‘dog’
		(ii)	[mə ˈhiː]	*va c’hi*	‘my dog’

- Except when the [ʧ] is followed by anything other than [i y]

(24)	a.	[ˈʧɛzəḡ]	*kazegennoù*	‘horses’
	b.	[mə ˈhjɛzəḡ]	*va c’hazegennoù*	‘my horses’
	c.	*[mə ˈhɛzəḡ]		

Mutation evidence cont’d

- The basic story is that [ʧ ∼ h] is underlyingly [k], palatalized by the following nuclear [i y] at the stem level
- Recall that our representations make this easy
- At the same time [ʧ ∼ hj] is underlyingly /kiV/, which comes out as [kjV] out of the stem level just as predicted, to avoid hiatus
- At the word level, it coalesces to [ʧ] when unmutated (good result)
- The mutation autosegment is a word-level morpheme: plausible given that spirantization is constrained by gender, number, definiteness and animacy
- At the input to the word level, it is concatenated with [kj], and [hj] is the entirely regular outcome of the mutation of this cluster

Conclusion

- At first blush, the relationship between high vowels and glides in Bothoa Breton is not very interesting
- A holistic investigation taking into account all the patterns reveals systematic exceptions
- A complete analysis is achieved using substance-free representations and a stratal model of computation
- A sufficiently sophisticated — but not overly elaborate — computation allows us to explain both the patterns of alternations between high vowels and glides and cases of seemingly unpredictable overlapping distribution
- High vowels and glides are not featurally distinct in Bothoa Breton, and there are no underlying glides in this language

Trugarez!

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